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January 25, 1994

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

By Hand

Mr. William F. Caton
Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Stop Code 1170
Washington, DC 20554

Re: ET Docket No. 93-62; Guidelines for
Evaluating the Environmental Effects
of Radio Frequency Radiation

Dear Mr. Caton:

Enclosed for filing in the above-referenced proceeding are the original and four copies of the Comments of Southwestern Bell Mobile Systems, Inc. Please file these Comments among the papers in this proceeding.

Please file-mark and return the extra copy of the Comments to the messenger.

Thank you for your assistance.

Sincerely,



Philip W. Horton

cc: Carol L. Tacker, Esq.

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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON D.C.

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JAN 25 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of
Guidelines for Evaluating the
Environmental Effects of
Radio Frequency Radiation

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ET Docket
No. 93-62

Comments of
Southwestern Bell Mobile Systems, Inc.

DATED: January 25, 1994

Wayne Watts
Carol Tacker
Richard Blackwell
Southwestern Bell
Mobile Systems, Inc.
17330 Preston Road, Suite 100A
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BEFORE THE
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| In the Matter of |) | |
| Guidelines for Evaluating the |) | ET Docket |
| Environmental Effects of |) | No. 93-62 |
| Radio Frequency Radiation |) | |

To: the Federal Communications Commission:

Comments of
Southwestern Bell Mobile Systems, Inc.

Southwestern Bell Mobile Systems, Inc. ("SBMS") submits these comments in the above-captioned proceeding. SBMS is one of the largest cellular carriers in the United States, and provides service to a significant number of customers both in wireline and non-wireline markets, and in both large and small markets.

I. BACKGROUND

On April 8, 1993, the Federal Communications Commission (the "FCC" or "Commission") released its Notice of Proposed Rulemaking in this docket relating to the amendment and updating of guidelines and methods used for evaluating the environmental effects of radio frequency radiation from FCC regulated facilities.¹ In the NPRM the Commission proposed the adoption of the newly revised

¹ Notice of Proposed Rulemaking (hereafter "NPRM"), released April 8, 1993.

guidelines adopted by the American National Standards Institute ("ANSI") and the Institute of Electrical and Electronics Engineers ("IEEE") that are designated ANSI/IEEE C 95.1 - 1992. In addition, the Commission sought comments on various issues relating to this docket.

II. PROPOSED GUIDELINE ADOPTION

SBMS supports the FCC's proposed adoption of the 1992 ANSI/IEEE standard. This standard incorporates the latest scientific data relating to biological and environmental effects of radio frequency radiation. As a cellular carrier, SBMS is understandably concerned about whatever effect the cellular and wireless radio industry might have on the environment. Users of cellular phones are entitled to use these instruments without worry or anxiety about whether a cellular phone has harmful biological or environmental effect. In addition, future users of the developing personal communications services will expect the same level of comfort regarding wireless services.

III. CONTROLLED VS. UNCONTROLLED ENVIRONMENT

SBMS agrees with the FCC that due to potential issues relating to health and safety, a conservative approach is appropriate in regard to the evaluation of the effects of RF exposure. The ANSI/IEEE standard divides the environment into two categories, controlled or uncontrolled. The ANSI/IEEE standard applies a more conservative measurement to uncontrolled environments, which are

defined in the ANSI/IEEE standard as "locations where there is the exposure of individual's who have no knowledge or control of their exposure."² Conversely, controlled environments are "locations where there is exposure that may be incurred by persons who are aware of the potential for exposure."³ It is logical to assign the less restrictive guidelines to a controlled environment where the amount, if any, of radio frequency radiation exposure can be measured and the individuals involved are exposed knowingly.

IV. LOW POWER DEVICES/EXCLUSIONS

The new ANSI/IEEE standard contains exclusions from radiated power requirements for low power devices. The use of the term "radiated power"⁴ is not correct, but that term will be employed in SBMS' analysis in order to be consistent with the NPRM. In controlled environments, the standard permits a radiated power exclusion for a device that operates in frequencies between 100 kHz and 450 MHz if the radiated power of the device is 7 watts or less. For devices that operate at frequencies between 450 and 1500 MHz, which includes the spectrum in which cellular currently operates, the radiated power must be limited to a formula equalling $\frac{7(450)}{f}$

² ANSI/IEEE C 95.1 - 1992

³ Id.

⁴ A more appropriate term would be "effective radiated power", see pg. 4, infra.

watts, where f = the frequency in megahertz. For instance, for cellular phones that operate at 850 MHz, the exclusion would apply if the radiated power of the phone is less than $\frac{7(450)}{850} = 3.7$ watts.

This exceeds the maximum output of any cellular phone, hand-held or otherwise, marketed in the United States today.

In uncontrolled environments which impose more restrictive guidelines, the standard for frequencies between 100 kHz and 450 MHz is 1.4 watts or less of radiated power. For frequencies between 450 and 1500 MHz, the radiated power must be limited to $\frac{1.4(450)}{f}$, where f = the frequency in megahertz. In an

uncontrolled environment, the maximum radiated power under the more restrictive guideline would be $\frac{1.4(450)}{850} = .74$ watts. This figure still exceeds the maximum output of hand-held cellular phones, which in the United States today is .6 watts.

The foregoing analysis is important because the ANSI/IEEE standard states that radiated power exclusions do not apply to a radiating structure maintained within 2.5 cm (approximately 1 inch) of the body. This would seemingly prohibit the radiated power exclusion from being applied to cellular phones. However, confusion is likely to occur for two reasons. First, as stated above, the term "radiated power" is incorrect because it is undefined. The term used should be "effective radiated power,"

"equivalent isotopically radiated power" or "equivalent monopole radiated power." These terms have been specifically defined within the FCC rules.

Additionally, the exclusions do not apply to devices where the "radiating structure [is] maintained within 2.5 centimeters of the body."⁵ On a cellular phone, the radiating structure is generally interpreted to be the antenna. Generally, the antenna of a cellular phone will not be within 2.5 centimeters of the user's body. However, an inherent problem exists in determining if an antenna is ever within that distance, and if so, when, how often and for how long is the device within that distance? Confusion will result as to whether or not this portion of the standard is applicable to hand-held cellular phones or not. Since, this portion of the standard is confusing, it should be clarified. However, if this standard is adopted as written, manufacturers should bear the burden of ensuring that the phones meet all requirements under the ANSI/IEEE standard.

The NPRM further states if [cellular phones] do "not comply with ANSI/IEEE guidelines with respect to radiated power, it may alternatively comply with ANSI/IEEE guidelines for specific absorption rate ("SAR")⁶. This provision allows certain transmitting devices to comply with the standard, even though they may not meet the requirements of the various exclusion criteria.

⁵ NPRM at 8.

⁶ Id.

The SAR guidelines are important since it would be quite difficult to define a group of all-encompassing exclusion criteria to cover transmitting devices for all applications, and at all operating frequencies.

Based on the Rules proposed within the NPRM and the ANSI/IEEE standard documents, the test procedures and methods set out in these documents to be used to verify compliance with the SAR guidelines do not appear to be straightforward and uniform in order to allow an unambiguous verification of compliance. For example, the Rules should provide specific information on conducting and interpreting SAR measurements in order to calculate reportable values of SAR. In particular, the Rules should reference documents which show how to determine the appropriate duty factor (the percentage of time which the transmitting device is typically in operation compared to the averaging time for the SAR measurement specified by the standard) of a transmitting device. If this were done, one manufacturer of transmitting devices would not have an unfair advantage over another producing like equipment, simply due to the fact that, for example, a different duty factor was assumed and utilized in calculating the SAR. It is indeed possible that the appropriate duty factor may be different for devices utilized in different services, such as, cellular, land mobile, SMR, narrowband PCS, and broadband PCS.

The industry should be strongly encouraged by the FCC to perform additional innovative research in the area of defining appropriate electromagnetic field modeling tools for appropriate

applications, as a more cost-effective alternative to measurement-based SAR analysis. Currently, tests to verify compliance with SAR guidelines must be conducted in a laboratory under specific test conditions using simulations of the human body. In comparison, a model-based approach approved for use within the standard and/or the Rules has the potential to avoid the increased cost of producing transmitting devices which do not meet at least one of the specified exclusion criteria.

Any requirement regarding SAR laboratory testing may be unfair to the cellular industry. These types of tests will be more complex and expensive and the results would be less objective and subject to more debate than radiated power tests. This will certainly raise the cost of hand-held cellular phones due to the manufacturers passing along the extra costs of complicated and expensive test procedures.

V. CONCLUSION

With minor modifications, SBMS endorses the proposed adoption of the ANSI/IEEE guidelines by the FCC. Appropriate regulations and enforcement by the FCC should help to ease any public concerns regarding the safety of this technology.

Respectfully submitted,

SOUTHWESTERN BELL MOBILE SYSTEMS, INC.

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January 25, 1994